



HAYDON SWITCH & INSTRUMENT, INC.

Building Confidence Through Dependability

1500 MERIDEN ROAD, WATERBURY, CONN. 06720

BULLETIN
NO. **42-2R**

FEBRUARY, 1965

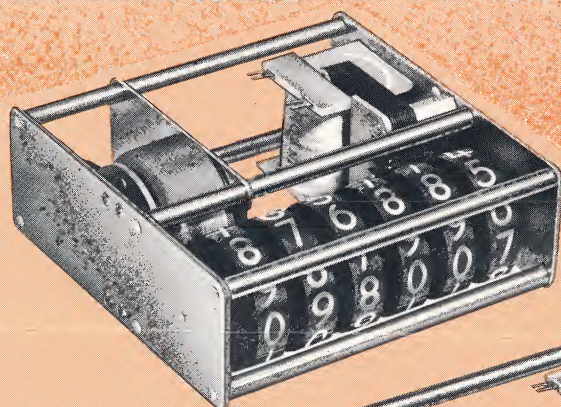


Fig. 1
Electrical reset

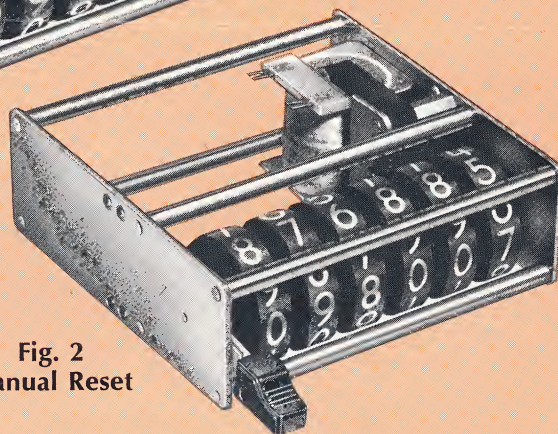


Fig. 2
Manual Reset

Series 42 PLANETGEAR[®] DIGITAL STOP CLOCK OR TIME TOTALIZER

Performance Characteristics

1. Timing motor voltage 115V, 60 C.P.S. or 24 V.D.C.
2. Reset coil voltage 24 V.D.C.
3. Power — timing motor
1 watt, 115V, 60 C.P.S.
or 4 watts, 24 V.D.C.
— Reset coil
20 watts (momentary)
24 V.D.C.
4. Accuracy ± 1 digit at 60 C.P.S.
input to timing motor.
5. Quiet operation.
6. Large numerals, 5/16 high.
7. Number of digits — 6 stand-
ard. (Additional drums may be
added)

Where
Optimum Performance
is the standard

Haydon Switch & Instrument, Inc. manual and electrically resettable stop clocks utilize the PLANET-GEAR counter driven by HSI 38 series synchronous A.C. motors or 37 series brushless D.C. timing motors. Large numeral read out provides rapid and accurate time measurement with minimum ambiguity in reading.

Haydon Switch & Instrument, Inc. stop clocks reset to zero almost instantaneously by depressing reset button on the manual style (fig. 2) or by momentarily energizing the reset coil on the electrically resettable unit (fig. 1).

SCHEMATIC WIRING DIAGRAM

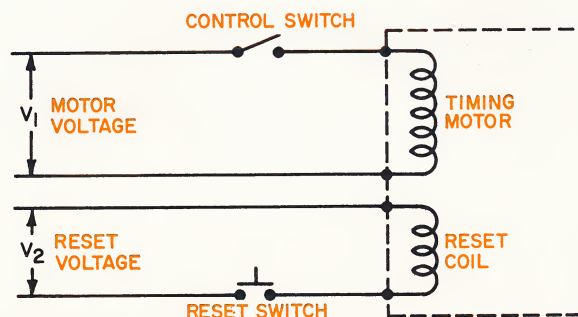


Fig. 3



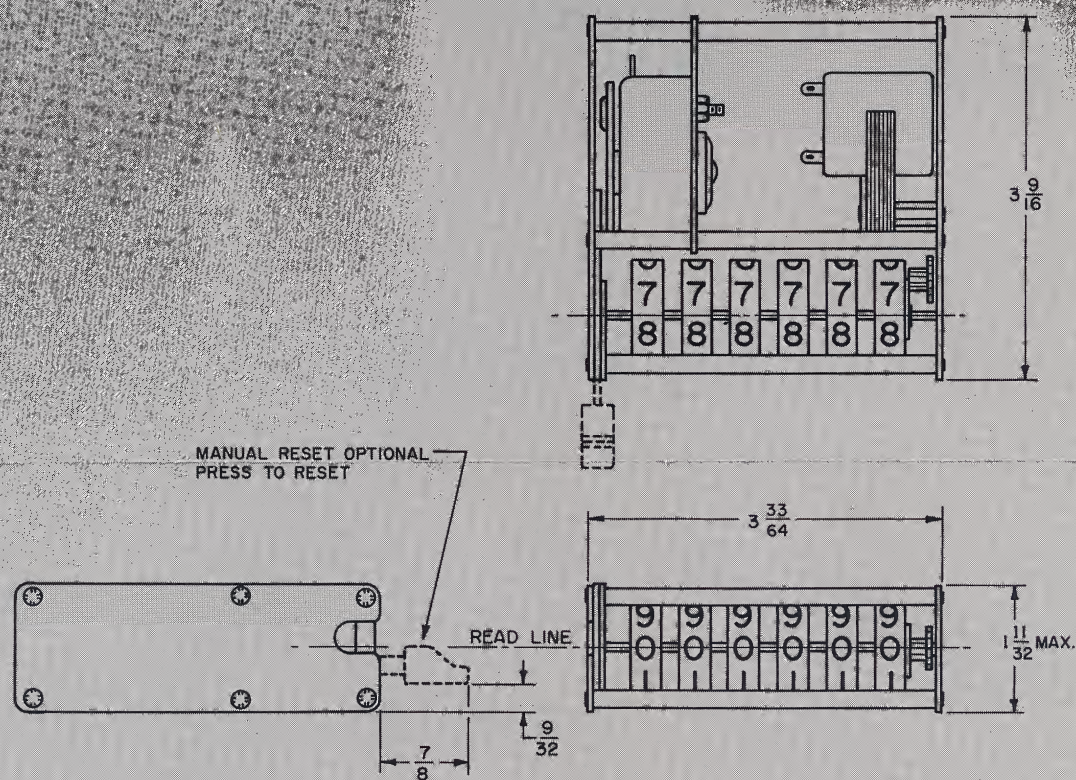
Series 42 Resettable PLANETGEAR® Stop Clocks or Time Totalizers

Model	Timing Motor Voltage V_1	Time Indication	Reset Coil Voltage V_2
42101M Manual	115V 60 CPS	99999.9 in 1/10 seconds	
42101E Electrical	115V 60 CPS	99999.9 in 1/10 seconds	24V DC
42102M Manual	24V DC	99999.9 in 1/10 seconds	
42102E Electrical	24V DC	99999.9 in 1/10 seconds	24V DC

Applications

Laboratory test equipment.
 Integration of small time increments.
 Events per unit time.
 Process control.
 Calibration of laboratory equipment.
 Use may be extended to any applications
 where precise measurement of time is a factor.

Dimensional Data



NOTE: Information contained herein is for general reference only and is subject to change without notice.

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1500 MERIDEN ROAD, WATERBURY, CONN. 06720

BULLETIN

NO. **42-3**

JUNE, 1966

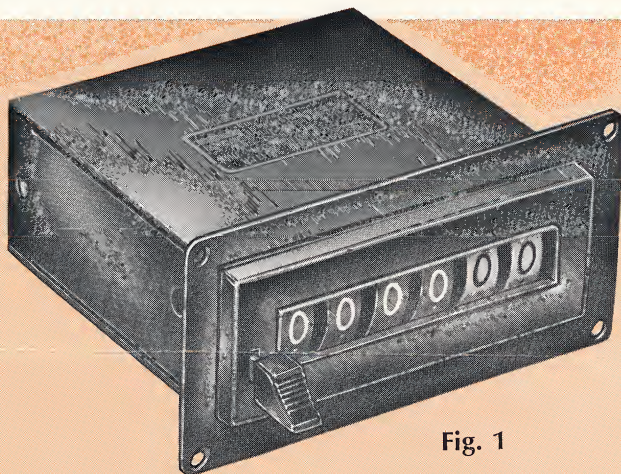


Fig. 1

Series 42 1/100 SECOND PLANETGEAR® STOP CLOCK

Measure or integrate time intervals in 1/100 second increments with this novel time totalizer.

MAJOR ADVANTAGES

1. **REQUIRES NO PRESTART OR STABILIZING BEFORE USE.**
2. **LARGE DIGIT READOUT ELIMINATES ERRORS IN READING.**
3. **MEMORY-RETAINS READINGS DESPITE LOSS OF POWER.**
4. **NO SPURIOUS COUNTS DUE TO LINE TRANSIENTS.**
5. **QUIET OPERATION.**
6. **EXTREMELY LONG LIFE.**

Extraordinary reliability and long life are assured by the remarkable PLANETGEAR® counter and high speed HSI integrating motor.

Driven by the HSI 38 series synchronous inductor motor from commercial 60 CPS power, this precision planetgear digital counter displays elapsed time in hundredths of seconds. Instant start-stop characteristic of the HSI motor combined with the low torque required to drive the counter eliminates need for a clutch. No prestart or "make ready" is required. Since the motor is directly coupled to the counter, the time totalizer is always ready to operate.

CIRCUITRY

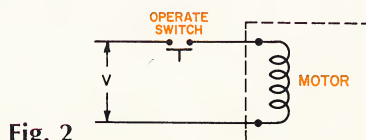


Fig. 2

MANUAL RESET

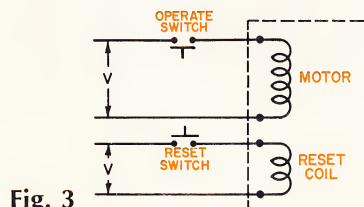


Fig. 3

ELECTRICAL RESET

Where
Optimum Performance
is the Standard

Specifications

Voltage — Motor 115V 60 CPS — 6 watt (available also for D.C. operation).
Reset Coil 24 VDC or 115V 60 CPS 20 watt.

Display — 6 Drum 9999.99 seconds.
8 Drum 999999.99 seconds.

Large digits 5/16 high. Seconds digits white on black. Tenths and hundredths digits black on white.

Reset — Manual, depress reset knob.
Electrical, momentary pulse to reset coil 500 MS max.

Accuracy — Max. error for any reading 20 ms; error averaged over 10 readings 5 ms typical, based on 60 CPS input.



Series 42 High Speed PLANETGEAR® Stop Clock

Control circuitry is minimized. Closure of a switch or relay contact energizes the motor starting the time interval. Opening of this circuit terminates the time interval and the elapsed time can be read immediately. Reading will be maintained until the unit is reset; no lost readings because of power interruption. Reset is accomplished by depressing the reset lever on the manually reset totalizer or momentarily closing

a switch to energize the reset coil. Reset occurs within $\frac{1}{2}$ second and the unit is immediately available for another operation. The electrical reset feature is especially advantageous for remote control or where automatic measurement of successive time intervals is to be made.

While the maximum error for any one reading is less than 20 ms, the average error over 10

or more readings is typically less than 5 ms. For integrating purposes, therefore, this unit will totalize small time increments with average error per increment well under 5 ms.

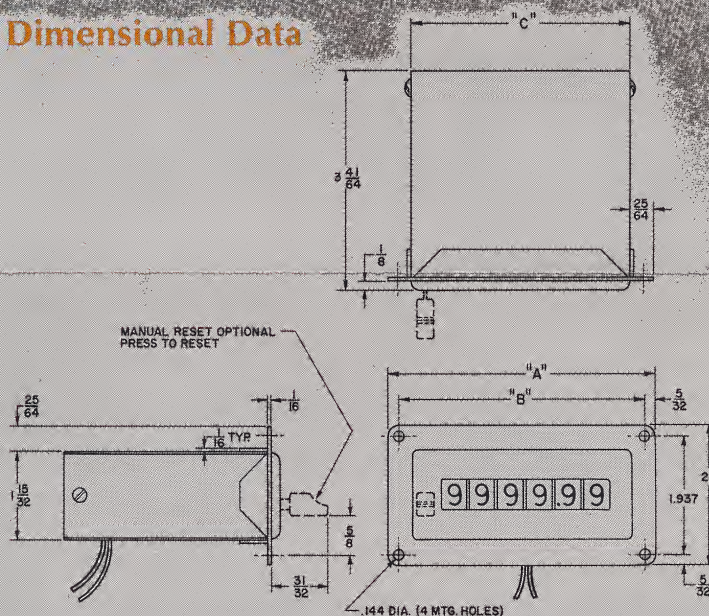
The 42 series stop clock may be used to directly measure time intervals to a high degree of accuracy or to integrate short time intervals occurring regularly or at random.

★ ★ ★

Fig. 4 Performance Characteristics

P/N	Readout	Motor Voltage	Reset Voltage		Dim. A	Dim. B	Dim. C
42101M-10	9999.99 Sec.	115V $\pm 10\%$ 60 CPS	—	Manual Reset	4½	4.187	3 ⁴⁵ / ₆₄
42101E-10	9999.99 Sec.	115V $\pm 10\%$ 60 CPS	24 VDC ± 2	Elec'l. Reset	4½	4.187	3 ⁴⁵ / ₆₄
42101E-11	9999.99 Sec.	115V $\pm 10\%$ 60 CPS	115V $\pm 10\%$ 60 CPS	Elec'l. Reset	4½	4.187	3 ⁴⁵ / ₆₄
42102M-10	999999.99 Sec.	115V $\pm 10\%$ 60 CPS	—	Manual Reset	5 ²⁵ / ₆₄	5.147	4 ²¹ / ₃₂
42102E-10	999999.99 Sec.	115V $\pm 10\%$ 60 CPS	24 VDC ± 2	Elec'l. Reset	5 ²⁵ / ₆₄	5.147	4 ²¹ / ₃₂
42102E-11	999999.99 Sec.	115V $\pm 10\%$ 60 CPS	115V $\pm 10\%$ 60 CPS	Elec'l. Reset	5 ²⁵ / ₆₄	5.147	4 ²¹ / ₃₂

Fig. 5 Dimensional Data



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1500 MERIDEN ROAD, WATERBURY, CONN. 06720

BULLETIN

NO. **44-1R**

FEBRUARY, 1965

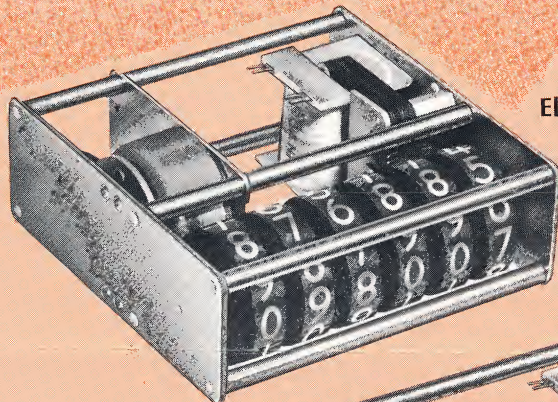


Fig. 1
Electrical
Reset

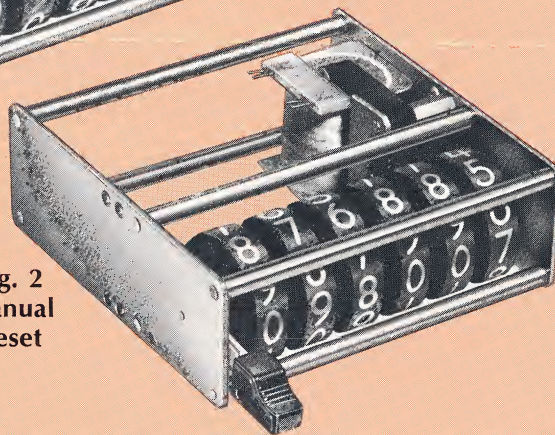


Fig. 2
Manual
Reset

Series 44 RESETTABLE PLANETGEAR® PULSE COUNTERS

The unique **HSI PLANETGEAR® principle** means that the 44 series manual and electrical reset pulse counters are infallible because the gears are always in mesh and cannot slip, skip or miss a count. These counters, also, offer extremely long life previously unobtainable in mechanical counters.

The **low torque** required to drive these PLANETGEAR counters permits the use of small stepper motors with a comparable life expectancy. The basic unit requires only three watts average input power. The PLANETGEAR feature of uniform low torque means that additional drums may be incorporated without increasing torque load on stepper motor.

Pulse rates of 40 or more pulses per second open up new areas of application. A rapid reset to zero is accomplished either manually or by a short duration electrical pulse.

The **PLANETGEAR® Resettable Pulse Counters** offer extremely quiet operation and long life because the unidirectional rotation of the stepper motor and the absence of Geneva transfer gears eliminates the basic sources of noise and rapid wear, especially at high counting rates.

The unusually large digits, 5/16" high, are easily read or photographed.

Performance Characteristics

- Pulse amplitude — 24 V.D.C. nominal.
- Pulse rate — 40 or more pulses per second.
- Reset coil voltage — 24 V.D.C. nominal.
- Power — stepper motor 3 watts average.
- Reset coil — 20 watts momentary.
- Number of digits — 6 standard.
(Additional drums may be added)
- Weight — 16 oz. approx.

Where
Optimum Performance
is the Standard



Series 44 Resettable PLANETGEAR® Pulse Counters

Schematic Diagram

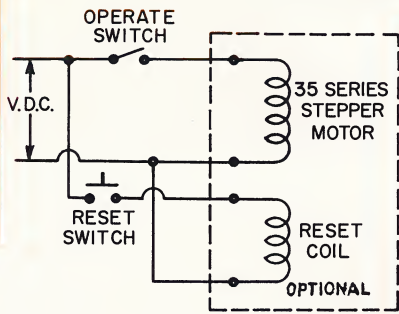


Fig. 3

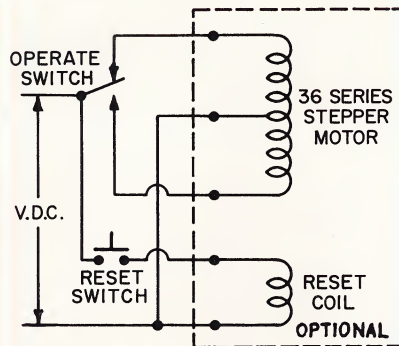


Fig. 4

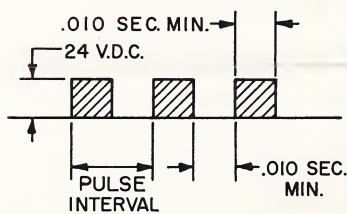


Fig. 5

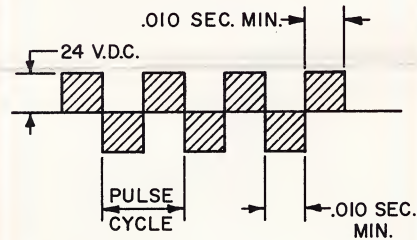


Fig. 6

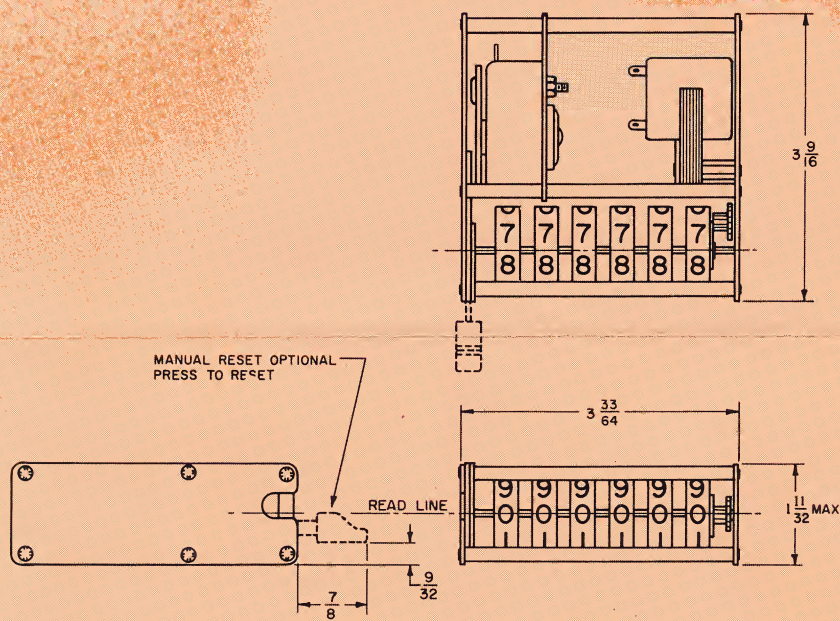
44 series pulse counters are furnished with either 35 or 36 series stepper motor drives.

44 series pulse counters, furnished with 35 series stepper motors, respond to pulses as shown in Fig. 5, registering one count for each pulse. No power is consumed during the interval between pulses and a S.P.S.T. switch or transistor is the only control circuitry needed.

The 44 series pulse counter with the 36 series stepper motor responds to the pulse train shown in Fig. 6 and requires each coil to be energized alternately in sequence to register one count. Repeated pulses, applied to one coil, will not cause counts to be registered.

Momentary closure of the reset switch (or depressing the reset button in manual units) will cause the counter to reset immediately to zero position.

Dimensional Data



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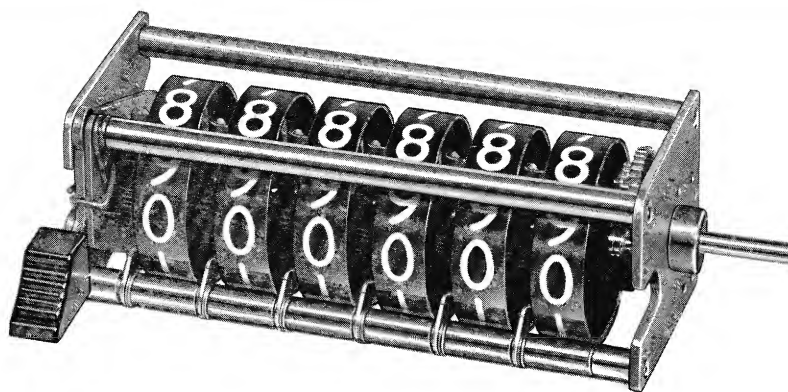
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REPRINT FROM NOV. 1965 ISSUE

OF

ELECTROMECHANICAL DESIGN FEATURING

PLANETGEAR[®] COUNTERS



Revolution Counters

Pulse Counters

Time Totalizers

Digital Clocks

NON RESET • MANUAL RESET • ELECTRICAL RESET



HAYDON SWITCH & INSTRUMENT, INC.

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PLANETGEAR COUNTER

100,000 counts/min with a mechanical digital counter

Counts at this level for 2000 hours duration would have been considered impossible until the advent of the PLANETGEAR counter, according to Fred Hoffman, Engineer, Haydon Switch & Instrument, Inc., Waterbury, Connecticut.

Geneva Counters

In the conventional digital counter utilizing the Geneva transfer principle (Fig 1), during transfer, the second decade must be accelerated suddenly from zero velocity to that of the driving drum and at the end of 36° suddenly stopped. Theoretically, infinite acceleration and deceleration occur but actually backlash and re-

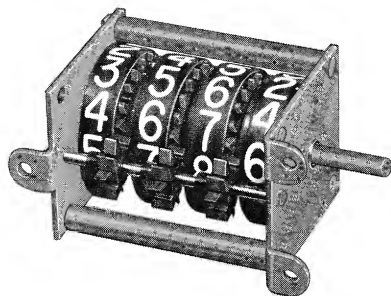


Fig 1 — Conventional digital counter with Geneva transfer.

siliency of the gearing introduce a finite time element. However, very high stresses are imposed on the gearing during transfer as is apparent from torque measurements (torque varies directly with inertia and acceleration) and audible clatter as driving speed is increased, until finally the shock impacts become so great that destruction occurs. Fig 2 gives typical displacement, velocity and acceleration curves for such counters.

Geneva type counters designed for high counting rates have relatively small drums designed to minimize inertia. To reduce acceleration of the decade drum during transfer, the first

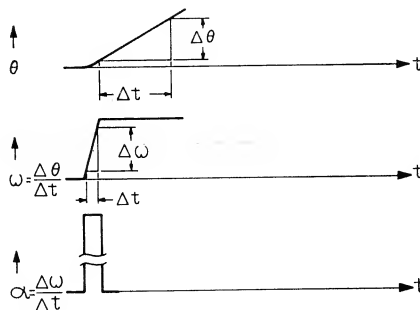


Fig 2 — Typical displacement, velocity and acceleration curves for conventional counter.

drum set may utilize a true "Maltese-Cross" Geneva (Fig 3) which permits higher speed operation but still does not solve the basic inherent problem. Inertia of the drum which is a function of size, material and design is the primary factor limiting operating speed and life; as speed is increased, life is markedly reduced. In a multi-drum counter, inertia increases with the number of drums when several transfer from nines to zero.

The inherent characteristics of Geneva type counters make large figure size and high speed-incompatible, and require driving torque sufficient to handle the maximum impact load imposed when all drums transfer from nines to zero. Fig 4 illustrates torque vs angular travel for 360° of the driving drum.

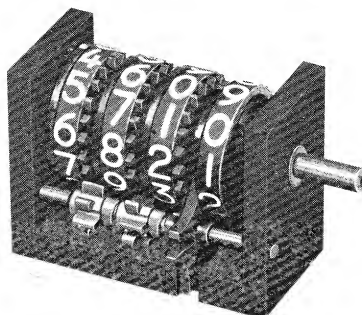


Fig 3 — Geneva counter with "Maltese Cross" in first drum set.

Planetgear Counter

The principle of operation of the PLANETGEAR (Fig 5) is entirely different. Decade transfer is effected by release of energy stored in a spring during 324° rotation of the driving drum. Transfer occurs with no additional loading of the driving drum during travel from nine to zero. There are no peak loading points, torque is low and relatively constant regardless of speed and number of drums. Typical torque characteristics are shown in Fig 6.

Between each pair of drums is interposed a 10:1 planetary gear reduction. On the lower order drum is an integral spiral cam on which

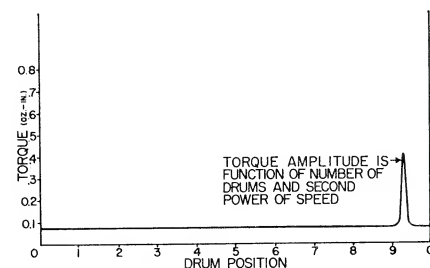


Fig 4 — Typical torque of small Geneva counter for one revolution of the driving drum.

rides a spring loaded follower arm so designed as to move the intermediate planetary gear in an arc and compensate for the motion of the decade drum which would otherwise occur. When the driving drum reaches the number 9, the follower drops from the rise of the cam instantly returning the planetary gear to its starting position and thus rotating the next decade drum 36°. The spring loaded follower stores energy during 324° rotation of the driving drum and then quickly releases this energy to transfer the next decade drum during the remaining 36° rotation.

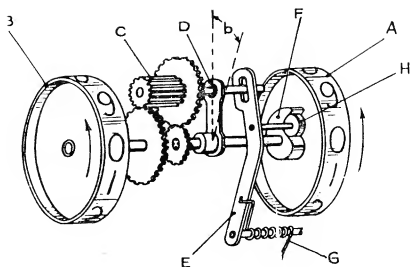


Fig 5 — Operating principle of the Planetgear.

The gears coupling one drum to the next always remain in mesh, thus no missed counts can occur. Multiple drum counters require but slightly more torque than a single drum unit due to the 10:1 ratios and the gradual storage of energy into the spring. There is no clatter — transfer is quiet because shock loading has been eliminated.

Since the spring loaded follower and planet arm form a resilient coupling between adjacent drums, driving torque is only that required to rotate the first drum, raising the spring loaded follower on the spiral cam, neglecting frictional losses and inertia of the follower and planetary arm which are insignificant. Typical torque values are from 0 to 0.5 oz-in. Mr. Hoffman stressed that drum speed is not a factor and the number of drums does not increase torque load within the rating of the counter.

High Speed Revolution Counting

During a recent test program to determine life expectancy, two PLANETGEAR revolution counters were driven at 1750 rpm (17,500 counts per min) for over 2000 hours before failure occurred: — total count over 2 billion: impossible with conventional mechanical counters, utilizing the Geneva principle. A third counter operated at 15,000 rpm (150,000 counts per min) for several minutes without damage. With follower arms raised it was driven at 10,000 rpm (100,000 counts per min) for over 2000 hours: — accumulated count

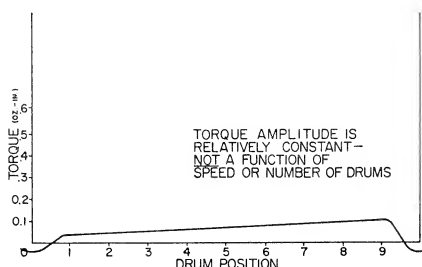


Fig 6 — Typical torque for one revolution of drum of Planetgear counter.

— in excess of 12 billion. Further life tests are in progress to evaluate speed vs life expectancy at these extremely high rates.

Pulse Counting

In the case of the Geneva counter used for pulse counting, the solenoid actuating mechanism or stepper motor (if used), must have sufficient torque capability at the highest step rate to turn all drums 36° at the highest load condition occurring in transfer from nines to zeros. Pulse counters typically require high power input and correspondingly small figures usually 3/16" high or smaller. Maximum rates are with few exceptions limited to 50 pps with greatly reduced life.

PLANETGEAR pulse counters on the other hand have numerals 5/16" high; can be supplied with any number of drums; with manual or electrical reset to zero, operate without sacrificing life (at up to 100 pps); and operate quietly even at extremely high pulse rates. Instead of an electro-magnetically actuated star wheel escapement, frequently a source of failure in conventional pulse counters, the PLANETGEAR pulse counter util-

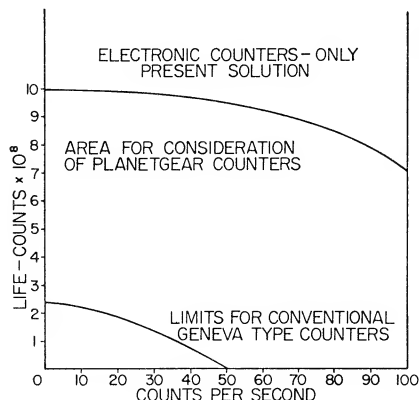


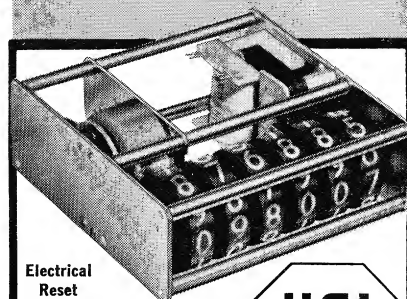
Fig 7 — Life vs counts/sec range for counters.

izes a stepper motor requiring only 4 watts average power and having an extremely long life.

As indicated in Fig 7, the PLANETGEAR counter fills a void between low speed, low cost conventional Geneva counters and complex sophisticated large and expensive electronic counters. It offers a reliable and economical solution for high rate counting problems and for many applications now requiring frequent replacement of electromechanical pulse counters or others in which electronic counters are used because conventional electromechanical pulse counters cannot provide required life or reliability at high pulse rates. ■

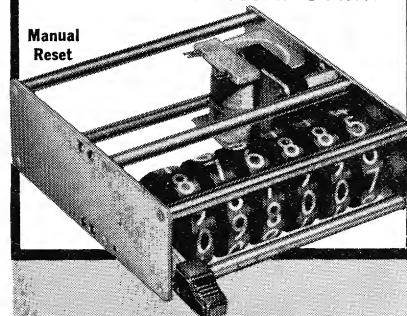
*Absolutely
Reliable*

**DUE TO
PLANETGEAR®
PRINCIPLE!**



**Digital
CLOCKS and
COUNTERS**

*Never Slip, Skip or
Miss a Count!*



This amazing feat is accomplished because with HSI PLANETGEAR the gears are always in mesh... even while resetting!

You need these trustworthy components if you have applications where there are demands for digital devices which:

- ... offer maximum rapid drum transfer.
- ... give high speed counting (over 2000 RPM).
- ... give infallible accuracy.
- ... long life at high speeds.

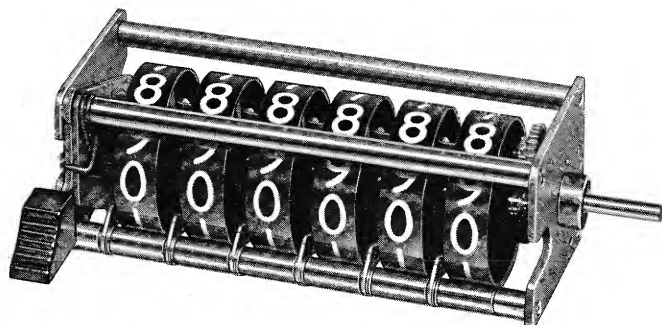
HSI has prepared a gold mine of scientific and technical data on its PLANETGEAR Pulse Counters and on the revolutionary Digital Stop Clocks and Time Totalizers. Without the slightest obligation write Haydon Switch & Instrument, Inc., 1500 Meriden Road, Waterbury, Conn. 06720 for Bulletins No. 44-1R (Counters) and No. 42-2R (Clocks).

HSI

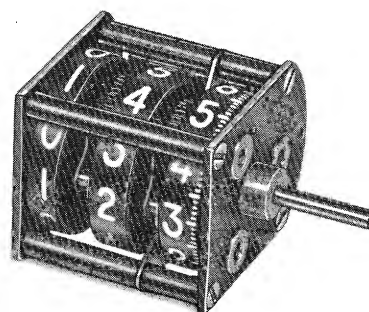
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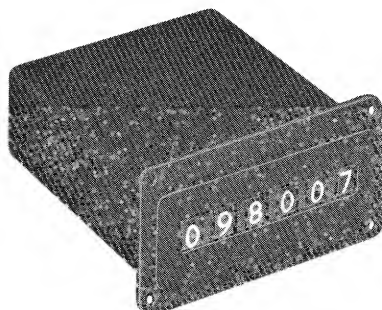
Typical PLANETGEAR® Counter Products



SERIES 43
Revolution Counter
Fig. 1



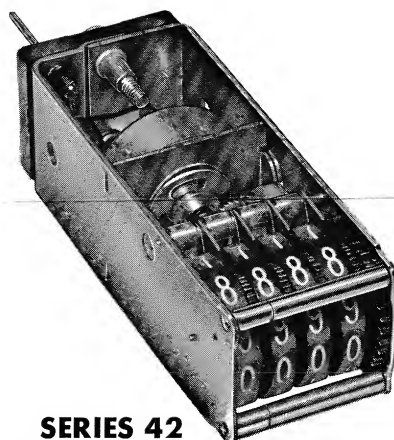
SERIES 43
Revolution Counter
Fig. 2



SERIES 42 Time Totalizer
SERIES 44 Pulse Counter
Fig. 3



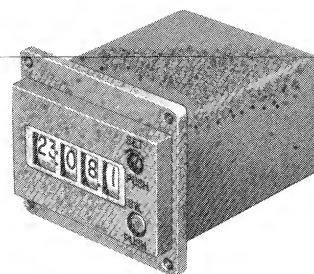
SERIES 44
8 Digit Pulse Counter
Fig. 4



SERIES 42
Time Totalizer
Fig. 5



4212
Digital Clock
Fig. 6



4214
Digital Clock
Fig. 7

U.S. PATENT 3064083
U.S. PATENT 3223322

CANADIAN PATENT 657193



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T. Nelson, Conslt.
Box 1546
Poughkeepsie, New York 12603

Thank you for your interest in...

Digital Clocks and Counters

The attached literature will give you the information you requested. Should you have further questions about your specific requirements, they can be answered by our representative in your area:

J. V. Costello
2030 Erie Blvd. East,
Syracuse, New York
PHONE: 315/GR2-0322



HAYDON SWITCH & INSTRUMENT, INC.
Building Confidence Through Dependability
 1500 MERIDEN ROAD, WATERBURY, CONN. 06720

BULLETIN
 NO. **AP-1**

MAY, 1966

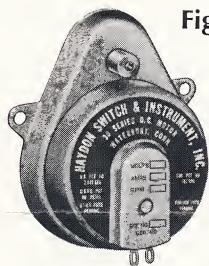


Fig. 1

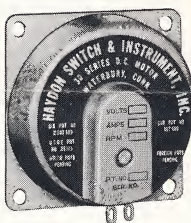


Fig. 2

SERIES 30 Printed Circuit D.C. Motor

Compact — Flange mounting $1\frac{3}{4}$ " sq. by only $\frac{5}{8}$ " long; with gear box $2\frac{1}{8}$ " x $2\frac{1}{2}$ " x $15/16$ " long.

Gear Train — Dependable spur gear reductions. 12 "Standard" output speeds from 1 to 75 RPM.

Reliability — No soldered connections. The commutator segments and rotor coils are all part of the trouble-free printed circuitry. Brushes have integral shunts welded to terminals.

Ref: Bulletin 30-1

MOTORS

H. S. I. PROUDLY PRESENTS THIS MAJOR PRODUCT LINE DIGEST For Your Convenience

SERIES 38 Bidirectional or Double Torque Synchronous A.C. Motor

Voltage — 115 VAC. Other voltages available.

Torque — (As reversible motor) 100 oz. in. @ 1 RPM.
 (As double torque motor) 200 oz. in. @ 1 RPM.

Starts, stops, reverses, instantaneously.

NOTE — 36 Series Stepper Motor and 37 Series Brushless D.C. Motor can also be furnished bidirectional in this configuration. Also, Bidirectional logic drive motor available in this configuration (5 wire)

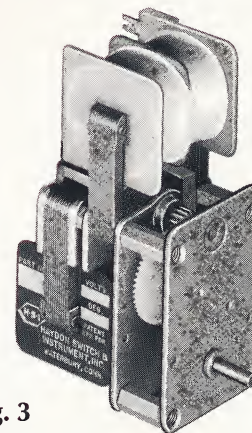


Fig. 3

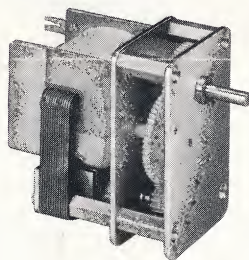


Fig. 4

SERIES 35 2-Wire & SERIES 36 3D Stepper Motors

2-Wire Stepper Motor

Brand new concept in motor design. 360° rotation per pulse. Requires no logic circuitry. Step rate 40 PPS standard.

Ref: Bulletin 35-1

3-Wire Stepper Motor

Another big forward step in motor design. 360° rotation per pulse. Step rate 50 PPS standard, up to 100 PPS special order. Requires simple control circuitry.

Ref: Bulletin 36-1

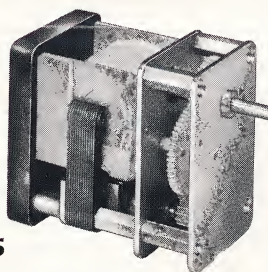


Fig. 5

SERIES 37 Brushless D.C. Motor

Revolutionary motor with no commutator, no brushes and no contacts.

Radio frequency interference is minimized by solid state suppression of the electronic switching.

Electronic circuitry can be synchronized to any desired accuracy by using the optional synchronization terminal.

Available with integral gear reduction and standard output speeds.

Lubricated for life.

Ref: Bulletin 37-1

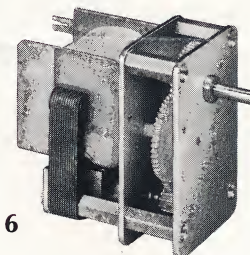


Fig. 6

SERIES 38 A.C. Synchronous Inductor Motor

Features high torque with extremely low power input.

Starts and locks in with line frequency within one cycle without any need for mechanical devices to insure correct rotation.

High torque makes it readily adaptable to chart drives and controls requiring constant speed output.

Compact frame $1\frac{1}{4}$ " x $1\frac{13}{16}$ ".

Available speeds — 120 to 1/60 R.P.M.

Ref: Bulletin 38-1



PRECISION SWITCHES

All HS&I hermetically sealed switches are evacuated and backfilled with dry nitrogen for positive protection against environmental conditions.

6100 series switches incorporate a silicone rubber diaphragm bonded to the switch housing. Withstands normal military environments. Can be supplied with special elastomer for JP-4 and other fuels.

HS&I switches are furnished with contacts of fine silver, gold diffused silver, platinum, etc., depending on the application involved. Special processing for controlled contact resistance where required.

Novel HS&I design enables switches to meet extreme vibration conditions. Switches exceed requirements of MIL-E-5272C ± 20 g, 5 to 2000 CPS.

Where
Optimum Performance
is the Standard

Building Confidence Through Dependability

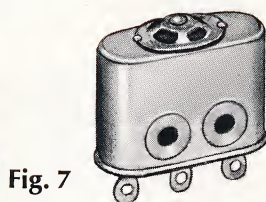


Fig. 7

SERIES 6100 Precision Hermetically Sealed Switch with Elastomer Seal

Standard rating $-65^{\circ}\text{F} +300^{\circ}\text{F}$
Available with rating $-65^{\circ}\text{F} +400^{\circ}\text{F}$
Electrical ratings 28 VDC/115 VAC
5 amperes Resistive, 3 amperes Inductive. Available with operating force as low as 9 ounces. MIL S-8805 Switches.

Ref. Catalog 72

NOTE— Leaf, roller, toggle and push button actuators are available for the Series 6100 Switch.

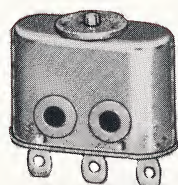


Fig. 8

SERIES 6100 Precision High Temperature Unsealed Switch

Rating $-65^{\circ}\text{F} +700^{\circ}\text{F}$
Electrical ratings 28 VDC/115 VAC
5 amperes Resistive, 3 amperes Inductive.

Ref: Bulletin 61H-1

NOTE— Leaf, roller, toggle and push button actuators are available for the Series 6100 Switch.

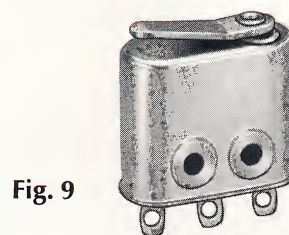


Fig. 9

SERIES 6300 Precision Hermetically Sealed Switch with All Metal Seal

Standard rating $-85^{\circ}\text{F} +300^{\circ}\text{F}$
Electrical ratings 28 VDC/115 VAC
5 amperes Resistive, 3 amperes Inductive. Operating force 22 oz. max. Stainless steel housing is resistant to most fuels, to solvents and is more resistant to external pressures. MIL-S-8805 Switches.

Ref. Catalog 72

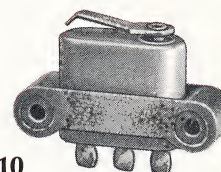


Fig. 10

SERIES 6200 Precision High Temperature Hermetically Sealed Switch with All Metal Seal

Actuator operates switch through metal diaphragm integral with housing. Base and housing are Heliarc welded to eliminate fluxes normally used in solder sealing.

Standard rating $-65^{\circ}\text{F} +660^{\circ}\text{F}$
Electrical rating 28 VDC/115 VAC
5 amperes Resistive, 3 amperes Inductive.

Ref: Catalog 72

HAYDON SWITCH & INSTRUMENT, INC. 1500 MERIDEN ROAD,

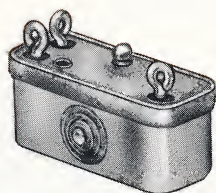


Fig. 11

SERIES 7100
Precision Hermetically
Sealed Switch with
Elastomer Seal

28 VDC/115 VAC 10 amperes Resistive,
4 amperes Inductive.

Form C contacts SPDT or double break.

Standard rating $-65^{\circ}\text{F} + 300^{\circ}\text{F}$

Available $-65^{\circ}\text{F} + 400^{\circ}\text{F}$

7100 available in reset and unsealed
types.

Ref: Catalog 72

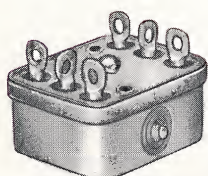


Fig. 12

SERIES 8100
Precision Hermetically
Sealed Switch with
Elastomer Seal

28 VDC/115 VAC 25 amperes Resistive,
8 amperes Inductive.

2 Form C contacts DPDT

Standard rating $-65^{\circ}\text{F} + 300^{\circ}\text{F}$

Ref: Catalog 72

NOTE — Leaf and roller actuators avail-
able for both Series 7100 and
8100 Switches.

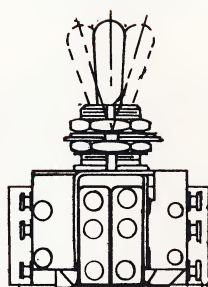


Fig. 13

SERIES 5300
4 Way Toggle Switch,
Center Off Position

Momentary, maintained or combinations.

Electrical rating 28 VDC/115 VAC

5 amperes Resistive, 3 amperes Induc-
tive. Can be furnished with up to 8
pole double throw, center off, in mo-
mentary contact, maintained contact
or in combinations thereof.

Standard rating $-65^{\circ}\text{F} + 250^{\circ}\text{F}$

Ref: Bulletin 53T-3



Fig. 14

TYPE 40137
Tease Proof Toggle Switch

Cannot be teased into an open elec-
trical condition.

Electrical rating 28 VDC 5 amperes Re-
sistive, 3 amperes Inductive — 115
VAC 2.5 amperes Resistive, 1 am-
pere Inductive.

Standard rating $-65^{\circ}\text{F} + 250^{\circ}\text{F}$

Ref: Bulletin 40137



**PRESSURE
SWITCHES**

Fig. 15
"Erect-To-Spec"
Kit

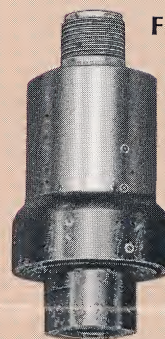


Fig. 16



Fig. 17

SERIES 15
Pressure Switches with
Diaphragm Actuated
Precision Switch

Superior sensitivity and reliability.

Available with settings from 1 PSIG to
3000 PSIG.

Electrical rating 28 VDC/115 VAC

5 amperes Resistive, 3 amperes Induc-
tive.

Ref: Bulletins 15-1, 15-2, 15-3

CLOCKS COUNTERS

Fig. 18
4212

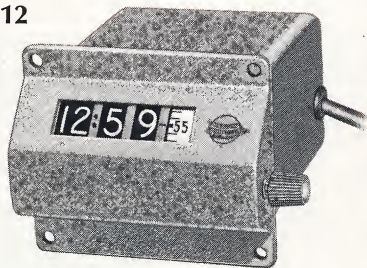
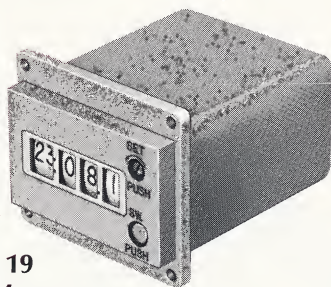


Fig. 19
4214



PLANETGEAR® Digital Clocks SERIES 4212 Slant Bezel SERIES 4214 Straight Bezel

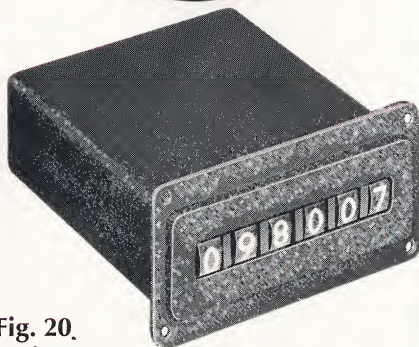
Available with optional 12 or 24 hour readout in tenths of minutes or seconds.

Standard voltage ratings 24 or 115 volts, 60 CPS. Others available on special order.

Large numerals 5/16 high to MS 33558 (ASG).

Manually settable.

Fig. 20,
Series 42



SERIES 42 PLANETGEAR® Digital Stop Clock or Time Totalizer

Timing motor voltage 115V, 60 CPS or 24 VDC

Reset coil voltage 24 VDC

Power . . . timing motor 1 watt, 115V, 60 CPS or 4 watts, 24 VDC

Power . . . reset coil 20 watts (momentary) 24 VDC

Accuracy ± 1 digit at 60 CPS input to timing motor.

Quiet operation.

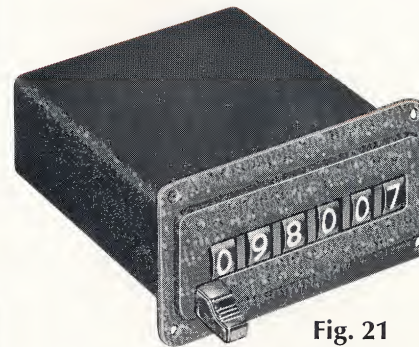
Number of digits 6 standard. (Additional drums may be added)

Rapid reset to zero either manually or by short duration electrical pulse.

Unusually large digits, 5/16" high, easily read or photographed.

Ref: Bulletin 42-2R

Fig. 21
Series 44



SERIES 44 Resettable PLANETGEAR® Pulse Counters

Infallible all the time as the gears are always in mesh (even while resetting) and cannot slip, skip or miss a count. Low torque permits use of small stepper motor.

Basic unit requires only 3 watts average input power.

Pulse rate of 40 or more pulses per second.

Up to 100 pulses per second on special order.

Stepper motor pulse amplitude 24 VDC, 0.012 second duration.

Reset coil voltage 24 VDC, other voltages available on special order.

Rapid reset to zero either manually or by short duration electrical pulse.

Unusually large digits, 5/16" high, easily read or photographed.

Ref: Bulletin 44-1R

The illustrations and technical data given on these pages only scratch the surface regarding these HSI products. For complete technical data please write for the bulletin or bulletins containing complete specifications on these new and amazing products that intrigue you. Write Haydon Switch & Instrument, Inc., 1500 Meriden Road, Waterbury, Connecticut 06720

NOTE: Information contained herein is for general reference only and is subject to change without notice.



HAYDON SWITCH & INSTRUMENT, INC.

Building Confidence Through Dependability

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